

REMARKS

This amendment is responsive to the Office Action of April 21, 2008.
Reconsideration and allowance of claims 1-22 are requested.

The Office Action

Claims 1, 12, and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sones, et al. (U.S. Patent No. 4,789,930).

Claims 2-10, 13-18, 20, and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sones in view of Enos (U.S. Patent No. 4,280,047).

Claim 11 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Sones in view of Karella (U.S. Patent Application No. 2002/0070365).

Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Sones in view of Mackie, et al. (U.S. Patent Application No 2002/0080912).

Claim 21 stands objected to as being dependent from itself.

The Drawings

The Examiner has made an objection to the drawings, indicating that reference numerals 20 and 24 are both used to designate a couch. Upon further review of the drawings, the Applicant has verified that the drawings as submitted are properly labeled, but could be clearer. The Applicant presently submits a replacement sheet containing new FIGURES 2A and 2B. Generally the same drawings, the figures have been inverted to reflect the orientation of FIGURE 1. The patient couch 24, previously not shown, has been added. The unidentified structure on the right-hand side of both of the old figures has been removed. It is respectfully submitted that the addition of the patient couch 24 to FIGURES 2A and 2B does not constitute new matter. The relationship of the patient couch 24 to the phantom 40 can be found, for example, at page 4, line 18 of the Applicant's original specification. An indication of the acceptability of the drawings is earnestly solicited.

Sones and Enos are not Combinable References

Sones is an x-ray imaging device that generates projection image data indicative of radiation attenuation (or transmissive) through the object in the imaging

region. Enos is a phantom for evaluating resolution of a nuclear imaging system (abstract) which generates data indicative of a radioisotope distribution within the imaging region. X-ray and nuclear imaging are different modalities that utilize different energy spectra detection methods, and geometry. To calibrate Sones, the patient P would be replaced by a phantom. The phantom would attenuate radiation, but the calibration would be based on the radiation from the x-ray tube 10, not radiation emitted by such a phantom. The X-ray tube emits radiation from a point source (or focal spot). Therefore the detectors are oriented and collimated towards that point source of known position. In PET imaging, the source is much broader, that is, anywhere within the subject or imaging region. Resultantly the detectors are oriented and collimated accordingly. In nuclear imaging, the radioactive source is in the imaging region. With projection x-ray imaging, the source (x-ray tube) is on the opposite side of the imaging region from the detector. The different locations of the sources of radiation make combination of an x-ray device and a nuclear imaging phantom impractical, and why one skilled in the art would not consider such a combination beneficial. It is respectfully submitted that there is no motivation to combine Enos with Sones.

**The Claims Distinguish Patentably
Over the References of Record**

Claim 1 now calls for a means for emitting radiation concurrently of at least first and second preselected energy levels, the means for emitting radiation being located in an imaging region of a nuclear imaging device. Sones fails to show this claimed limitation. Sones, in contrast, has a typical x-ray tube that emits x-rays over a broad energy spectrum. The source is located outside of the imaging region and the x-rays pass through the imaging region to detectors on the other side. Sones does not disclose a means for emitting radiation in the imaging region. Sones provides no suggestion that one should remove the x-ray tube (and associated cooling and electrical circuits, not shown) and place the x-ray tube in the imaging region where the patient P is. Such a repositioning of the x-ray tube would render the Sones system unsuited to its intended purpose. It is therefore respectfully submitted that claim 1 and claims 2-11 dependent therefrom now distinguish patentably and unobviously over the references of record.

Claim 12 now calls for concurrently emitting radiation at at least first and second preselected energy levels from an imaging region of the nuclear imaging system. Sones, in contrast, emits x-rays from outside the imaging region towards detectors across the imaging region from the source to measure radiation attenuation in the imaging region. Though claim 12 is currently only rejected over Sones, there would be no motivation to combine Enos with Sones, since x-ray projection imaging and nuclear imaging are such different modalities, as set forth above. It is therefore respectfully submitted that **claim 12** distinguishes patentably and unobviously over the references of record.

The rejection of **Claim 13** has been converted from a §102(b) rejection over Enos to a §103(a) rejection over Sones in view of Enos. The Examiner asserts that Sones shows a phantom (page 4, lines 4-7 of the Office Action). However, the Sones x-ray tube is not placed in the phantom. the described phantom is an attenuation phantom. No motivation is provided for a radiation emitting phantom. Sones images based on radiation attenuation in the imaging region. The Enos phantom is designed for an imager which generates images of radioisotope distributions in the imaging region. Because the two imaging systems operate in different ways to generate different results, it is submitted that one of ordinary skill would not expect the phantom of Enos to be effective in the Sones imager.

Moreover, even if the Enos phantom were placed in the Sones imager, the combination would not meet claim 13. The only radioisotope in the imaging region would be the optional isotope in the water 16. There is no disclosure in Enos of the phantom generating radiation of a secondary energy by secondary emission. In fact, the two energy peaks received by the Sones imager even with the Enos phantom in the imaging region would both be from the radiation from the x-ray tube. The Sones calibration would be unaffected by any radioisotope radiation coming from the Enos phantom.

For the aforementioned reasons, it is respectfully submitted that **claim 13** and **claims 14-19** dependent therefrom distinguish patentably and unobviously over the references of record.

Claim 20 calls for an energy level calibration phantom. Enos does not calibrate energy levels. The Examiner has stated, on page 6, lines 3-7 of the detailed

action that contrast equates to first and second energy levels. The Applicant respectfully submits that this is an incorrect equation. The contrast, as produced by Enos, is the result of a greater number of photons reaching the detector in some places than others. Only a small number of photons that only pass through the liquid layer of Enos are absorbed or scattered, thus more photons reach the detector in those areas. Where photons have to pass through the metal disks, a far greater number of photons are absorbed, meaning fewer photons reach the detector in those areas. The result is contrast between the two areas. The photons themselves, assuming that they are all produced by the radioactive Technetium, are all the same characteristic energy (140 KeV), regardless of whether they hit the metal disks or not. The metal disks of Enos change the intensity of the radiation that reaches the detector in Enos, not the energy of the photons, as in claim 20. Accordingly, the combination of Sones and Enos does not obviate **claim 20** or **claim 22** dependent therefrom.

CONCLUSION

For the reasons set forth above, it is submitted that claims 1-22 distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

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